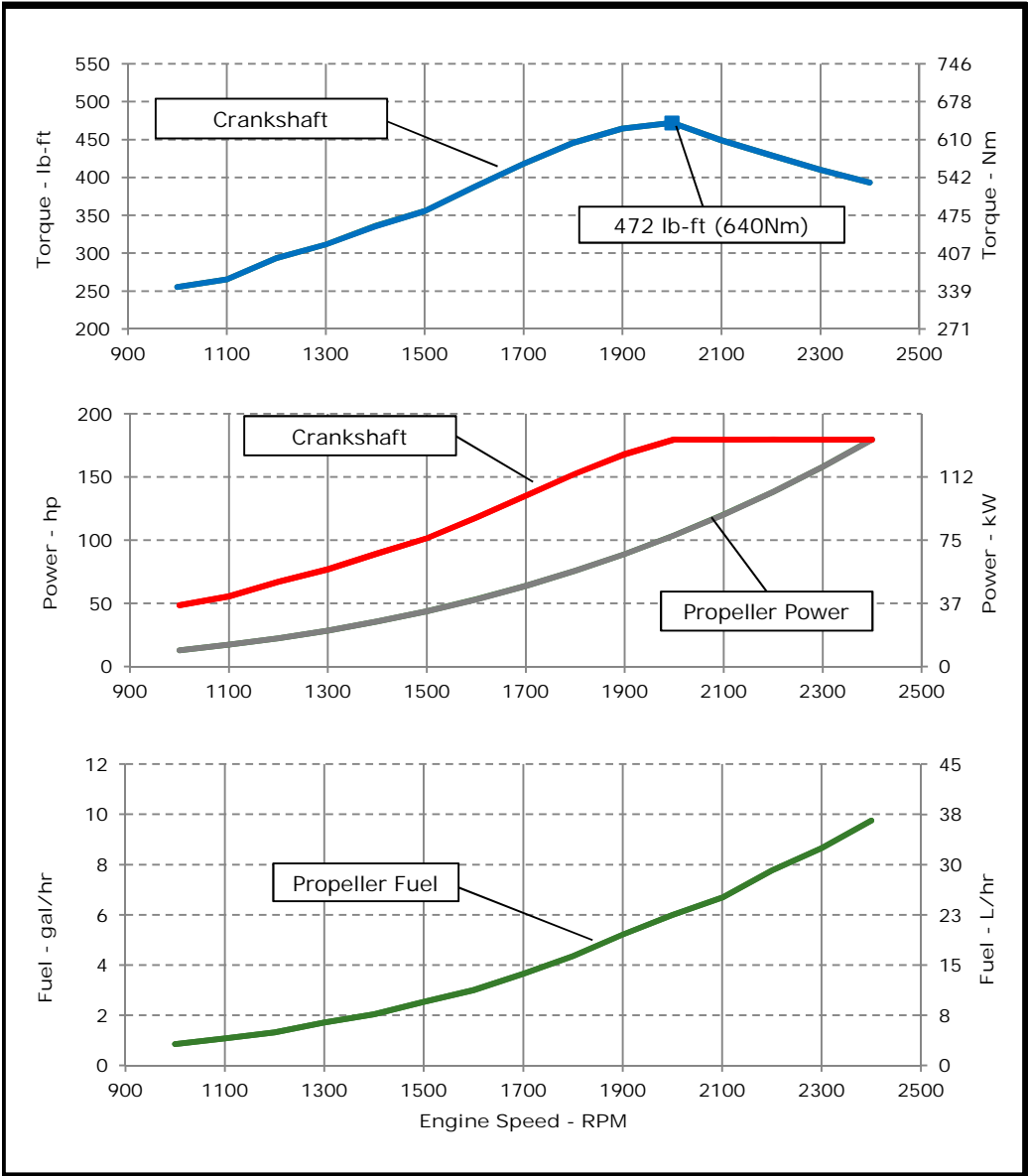




**ENGINE PERFORMANCE CURVE**

Rating: M2 - 180hp (134kW) @ 2400 RPM  
 Application: Marine

PowerTech™ 4.5L Engine  
 Model: 4045AFM85



**REFERENCE CONDITIONS**

Air Intake Restriction..... 12 in.H<sub>2</sub>O (3 kPa)  
 Exhaust Back Pressure..... 30 in.H<sub>2</sub>O (7.5 kPa)

Rated speed and power  
 Gross power guaranteed within ±5% at SAE J1995 and ISO 3046  
 J1995 and ISO 3046 conditions:  
 77 °F (25 °C) air inlet temperature  
 29.31 in.Hg (99 kPa) barometric pressure  
 104 °F (40 °C) fuel inlet temperature  
 0.853 fuel specific gravity @ 60 °F (15.5 °C)

Ambient air temperature is defined to be the temperature of ambient air close to operating vessel that is not influenced in any manner by operating characteristics of the vessel (free field temp).

Conversion factors:  
 Power: kW = hp x 0.746  
 Fuel: 1 gal = 7.1 lb, 1 L = 0.85 kg  
 Torque: N-m = lb-ft x 1.356

All values from currently available data. Subject to manufacturing and measurement variations and to change without notice.  
 Actual performance is subject to application and operation conditions outside of John Deere control.

**Notes:**

*M2:* The M2 rating is for marine propulsion applications that typically operate between 3,000-5,000 hours per year and have load factors up to 65 percent. This rating is for applications that are in continuous use and use full power for no more than 16 hours of each 24 hours of operation. The remaining time of operation is at or below cruising speed.

*Possible applications:* Short-range tugs and towboats long-range ferryboats, large passenger vessels and offshore displacement hull fishing boats

**Designed/Calibrated to meet:**

- EPA Commercial Marine Tier 3
- IMO MARPOL Annex VI Compliant
- NRMM (97/68/EC), as amended

Ref: Engine Emission Label

**Certified by:**

*Adam Paul*

Performance Curve: 4045AFM85\_B

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

# Engine Installation Criteria

## General Data

Model	4045AFM85		
Number of Cylinders	4		
Bore	107 mm	4.21 in	
Stroke	127 mm	5.00 in	
Displacement	4.5 L	273 in <sup>3</sup>	
Compression Ratio	16.7:1		
Valves per Cylinder, Intake/Exhaust	2/2		
Combustion System	Direct injection		
Firing Order	1-3-4-2		
Engine Type	In line, 4 Cycle		
Aspiration	Turbocharged and Aftercooled		
Aftercooling System	Engine coolant		
Engine Crankcase Vent System	Closed		

## Cooling System\*

Engine Coolant Heat Rejection**	145 kW	8253 BTU/min
Max. Pressure Drop Across Keel Cooler	40 kPa	5.8 psi
Coolant Flow	208 L/min	55 gal/min
Seawater Flow (heat exchanged)	235 L/min	62 gal/min
Thermostat Start to Open	71 °C	160 °F
Thermostat Fully Open	83 °C	182 °F
Engine Coolant Capacity, HE	17 L	4.4 gal
Engine Coolant Capacity, KC	20 L	5.2 gal
Min. Coolant Fill Rate	12 L/min	3.2 gal/min
Min. Pressure Cap	110.3 kPa	16 psi
Min. Pump Inlet Pressure	30 kPa	4.4 psi
Max. External Coolant Restriction	40 kPa	5.8 psi
Normal Operation Max Top Tank Temperature	100 °C	212 °F
≤ 5% of Total Operating Time Top Tank Temperature	100-110 °C	212-230 °F
Absolute Max Top Tank Temperature	110 °C	230 °F
Recommended Fuel Cooler	9 kW	485 BTU/min
Engine Radiated Heat	19 kW	1054 BTU/min

\* The cooling system should be capable of typical at ambient up to the maximum conditions in which the vessel will operate.

Typical operation is defined as the average load sustainable in the vessel over 10 min.

\*\* Reference 32 °C Sea Water Temperature

## Physical Data

Length to rear face of block	752 mm	29.6 in
Length maximum	1105 mm	43.5 in
Width maximum	770 mm	30.3 in
Height, crank centerline to top	654 mm	25.7 in
Height, crank centerline to bottom	310 mm	310 in
Weight, with oil, no coolant (includes engine, flywheel housing, flywheel, and electronics)	578 kg	1274 lb
Center of Gravity Location, X-axis From Rear Face of Block	273 mm	10.8 in
Center of Gravity Location, Y-axis Right of Crankshaft	4.78 mm	0.2 in
Center of Gravity Location, Z-axis Above Crankshaft	227 mm	8.9 in
Max. Allowable Static Bending Moment At Rear Face of Flywheel Housing with 5-G Load	814 Nm	600 lb-ft
Thrust Bearing Load Limit, Forward Continuous	2.2 kN	495 lbf
Thrust Bearing Load Limit, Forward Intermittent	4 kN	899 lbf
Thrust Bearing Load Limit, Rearward Continuous	1 kN	225 lbf
Thrust Bearing Load Limit, Rearward Intermittent	2 kN	450 lbf

## Electrical System

Min. Recommended Battery Capacity, 12V @32 °F (0 °C)	925 amps
Min. Recommended Battery Capacity, 24V @32 °F (0 °C)	625 amps
Starter Rolling Current, 12V @32 °F (0 °C)	920 amps
Starter Rolling Current, 24V @32 °F (0 °C)	600 amps
Min. Voltage at ECU during Cranking, 12V	6 volts
Min. Voltage at ECU during Cranking, 24V	10 volts
Max. Allowable Start Circuit Resistance, 12V	0.002 ohms
Max. Allowable Start Circuit Resistance, 24V	0.0012 ohms
Recommended Starter Cable, 12V 100"	#0
Recommended Starter Cable, 24V 100"	#4
Recommended Starter Cable, 12V 200"	#000 or #20
Recommended Starter Cable, 24V 200"	#2
Electrical Component Maximum Temperature Limit	125 °C 257 °F

Performance Curve: 4045AFM85\_B

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

# Engine Installation Criteria

## Fuel System

ECU Description	L14		
Fuel Injection Pump	HPCR		
Governor Type	Electronic		
Volumetric Fuel Consumption	36.9 L/hr	9.7 gal/hr	
Mass Fuel Consumption	31.4 kg/hr	69 lb/hr	
Total Fuel Volumetric Flow	152 L/hr	40.0 gal/hr	
Total Fuel Mass Flow	129 kg/hr	284 lb/hr	
Max. Fuel Inlet Restriction*	20 kPa	80 in.H2O	
Max. Fuel Inlet Pressure	20 kPa	80 in.H2O	
Max Fuel Return Pressure	20 kPa	80 in.H2O	
Max. Fuel Height Above Transfer Pump	2.4 m	7.9 ft	
Max. Leak-off Return Height	2.4 m	7.9 ft	
Max. Fuel Inlet Height Above Fuel Tank Supply	2.4 m	7.9 ft	
Normal Operation Fuel Temperature	40 °C	104 °F	
Max. Fuel Inlet Temperature	100 °C	212 °F	
Min. Recommended Fuel Line Inside Diameter	6.63 mm	0.26 in	
Min. Recommended Fuel Line Size	5 (-) AN		
Primary Fuel Filter	10 mic		
Secondary Fuel Filter	2 mic		

## Lubrication System

Oil Pressure at Rated Speed	436 kPa	63 psi	
Oil Pressure at Low Idle (800rpm)**	213 kPa	31 psi	
Max. Crankcase Pressure	2 kPa	8 in.H2O	
Maximum Installed Angle, Front Down	0 deg		
Maximum Installed Angle, Front Up	12 deg		
Engine Angularity Limits Any Direction, Continuous***	35 deg		
Engine Angularity Limits Any Direction, Intermittent***	45 deg		

\* With clean filters

\*\* With John Deere Plus-50 II™ 15w-40, not applicable with break in oil.

\*\*\* With 19CZ option

## Air Intake System

Engine Air Flow	10.95 m <sup>3</sup> /min	386.7 ft <sup>3</sup> /min	
Intake Manifold Pressure	156.7 kPa	22.7 psi	
Manifold Air Temperature	81 °C	189 °F	
Maximum Manifold Air Temperature	130 °C	266 °F	
Max. Allowable Temperature Rise, Ambient	17 °C	30 °F	
Air to Engine Inlet			
Max. Air Intake Restriction, Clean Air Cleaner	3 kPa	12 in.H2O	
Max. Air Intake Restriction, Dirty Air Cleaner	6.25 kPa	25 in.H2O	
Min. Ventilation Area	0.067 m <sup>2</sup>	104 in <sup>2</sup>	

## Performance Data

Rated Power	134 kW	180 hp	
Rated Speed	2400 RPM		
Peak Torque Speed	2000 RPM		
Low Idle Speed	600 RPM		
Rated Torque	533 Nm	393 ft-lb	
Peak Torque	604 Nm	446 ft-lb	
BMEP, Rated	1496 kPa	217 psi	
Rated Pferdestärke (metric hp)	182 ps		
Front Drive Capacity, Intermittent	621 Nm	458 lb-ft	
Front Drive Capacity, Continuous	621 Nm	458 lb-ft	

## Exhaust System

Exhaust Flow	24.9 m <sup>3</sup> /min	879 ft <sup>3</sup> /min	
Exhaust Flow @ gas STP	11.26 m <sup>3</sup> /min	398 ft <sup>3</sup> /min	
Exhaust Temperature	438 °C	820 °F	
Max. Allowable Exhaust Restriction	7.5 kPa	30 in.H2O	
Max. Shear on Turbocharger Exhaust Outlet	11 kg	24.3 lb	
Max. Bending Moment on Turbocharger Exhaust Outlet	7 Nm	15.4 lb-ft	
Min. Exhaust Pipe Diameter, Dry	101.6 mm	4.0 in	
Min. Exhaust Pipe Diameter, Wet	114.3 mm	4.5 in	

Performance Curve: 4045AFM85\_B

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.

## Engine Installation Criteria

Engine Performance Data Table

Engine Speed	Crank Power		Crank Torque		* Prop Power		* Prop Fuel		* Prop BSFC
	RPM	kW	hp	Nm	lb-ft	kW	hp	L/hr	gal/hr
2400	134	180	533	393	134	180	37	10	234
2300	134	180	556	410	118	158	33	9	236
2200	134	180	582	429	103	138	29	8	242
2100	134	180	609	449	90	120	25	7	239
2000	134	180	640	472	78	104	23	6	248
1900	125	168	630	465	66	89	20	5	252
1800	114	153	604	446	57	76	16	4	248
1700	101	135	567	418	48	64	14	4	246
1600	88	118	525	387	40	53	11	3	244
1500	76	102	482	356	33	44	10	3	250
1400	67	89	455	336	27	36	8	2	246
1300	57	77	422	311	21	29	6	2	258
1200	50	67	398	294	17	22	5	1	255
1100	41	56	360	266	13	17	4	1	268
1000	36	49	346	255	10	13	3	1	283

\* Theoretical 3.0 exponent propeller curve , measured at flywheel

Performance Curve: 4045AFM85\_B

All values at rated speed, power, and standard conditions, per SAE J1995 unless otherwise noted.